REMARKS

Claims 1-18 are pending. New claims 17 and 18 are added herein.

I. Overview of the Office Action.

All of the claims stand rejected as anticipated by one cited reference, Kennedy et al.

An obviousness type double patenting rejection is alleged in view of two prior patents to assignee.

The IDS and Abstract also stand objected to and have been corrected.

II. The IDS is resubmitted with English abstracts of the three German references.

At page 2 of the Office Action, it was requested that the IDS be resubmitted. The IDS is resubmitted herein with English abstracts of the three German references.

III. The Abstract has been corrected.

At page 3 of the Office Action, the Abstract stands objected to. The Abstract has been shortened to be within 150 words as required.

IV. Brief description for the convenience of the Examiner.

Applicants provide the following summary, not to argue limitations which are unclaimed, but merely to assist the Examiner in quickly getting an overview of the disclosed embodiment(s).

The present invention drives clusters of LEDs which are typically used in automotive taillights. The clusters are driven by using a "pulsed" LED drive to eliminate the shortcomings of known approaches which use series resistors, such as drive power loss. Additionally, a control loop

circuit drives a first or master LED cluster and also drives a plurality of second or slave LED clusters with a clock signal (CLK) so that unique control loops and individual drive circuits are not required for each LED cluster. Applicants distinguish this invention from their previous patents in this field and the prior art, by including a structure and method for measuring the total current U_{Mess} through the second clusters, and by comparing U_{Mess} in a diagnosis unit 50 to a user defined desired current value (U_{OL}). The advantage of using U_{OL} is that a fault message is not generated until U_{Mess} falls below U_{OL}, as shown in Figure 4b. Therefore, this structure and method allow one LED cluster (for example) to fail at time "t1" and the taillight will continue to operate, without generating a fault message or interrupting operation, because although the overall luminance is diminished, it is still acceptable according to user defined threshold value U_{OL}. Only at time "t2," when an additional cluster (for example) fails will a fault message be generated. Again, the present invention uses a desired value for the U_{OL} which is set by the user. Thus the present invention allows the overall taillight to function even when one or more LED clusters fails. Also, the invention eliminates the costly use of a multiplexer 30 to monitor each LED cluster, a counter 28, and a plurality of individual driver blocks which are necessary in the arrangement disclosed in US Patent 6,400,101 (the '101 patent) discussed below and in the background section at page 3 of the present specification.

V. The nonstatutory double patenting rejection in view of assignee's patents, 6,400,101 (the '101 patent) and 6,515,434 (the '434 patent) is respectfully asserted to be inappropriate because a different invention is presently claimed.

Present claims 1-16 stand rejected under the doctrine of obviousness-type double patenting as unpatentable over claims 1-18 of the '101 patent in view of claims 1-7 of the '434 patent.

At page 3 of the Office Action, the USPTO suggests that a terminal disclaimer be filed. However, applicants respectfully assert that a terminal disclaimer is not required because the two cited patents have very different disclosures and claims. This is readily apparent from comparing the drawings for example. Such patents do not teach, suggest, or claim, the present invention, nor are claims in the present application obvious thereover.

Briefly, the '101 patent deals with the concept of pulse driving a series of LED's connected in a series for better drive efficiency by using a constant mean value current (iLED). The '434 patent uses the "master/slave" concept to drive multiple clusters using one or a minimal number of control loops (note: the control loop operates as in the '101 patent with (iLED)). Neither of these patents discloses, let alone claims, the features of summing the current in at least two of the second or slave clusters to find U_{Mess}, and comparing U_{Mess} with a desired value U_{OL} as shown in present Figures 4b, 5 and 6 (see U_{OL} in Fig. 6 which is the desired value and the summary discussion in section IV above). Thus, a terminal disclaimer is respectfully asserted to not be necessary.

The above-mentioned features of the present-claimed invention are not made obvious by either of the cited patents. As discussed above, such features are highly useful because a car with a taillight comprised of many LED clusters may have the overall taillight continue to operate even if one or more clusters fail by using the presently claimed invention which sums the current from the taillight clusters and compares that sum to desired prescribed magnitude U_{OL} rather than monitoring each slave cluster individually. This is best seen in present Figure 4b wherein at time "t_1" a cluster fails and the taillight remains operational until time "t_2" when an additional cluster fails. Nothing like this is discussed or claimed in the two cited patents.

In fact, in the background of the present invention at page 3, lines 17 through page 4, line 11, the '101 patent is discussed and actual figures from that patent are used as prior art, i.e., present

Figure 1 (same as Fig. 4a, 4b in the '101 patent) and present Figure 2 (same as Figure 7 in the '101 patent). It can be readily seen that the claims of the '101 patent and its specification are different from the claims of the present application at least because the current in each cluster is monitored individually and not as presently claimed in a sum of at least two second clusters. Thus, the present claims differ from the claims of the '101 patent, and thus the '101 patent was made part of the prior art and background section of the invention by the applicants.

The second patent, the '434 patent, also does not teach or suggest the presently claimed structure or method of using a sum measurement U_{Mess} of at least two second clusters and comparing U_{Mess} to desired value U_{ol} as presently claimed. For example, claim 1 of '434 might initially seem to be very similar to the present claims; however, the above discussed presently claimed features are not disclosed or claimed therein.

Therefore, a comparison of the claims and disclosure of the '101 patent and the '434 patent to the present claims as required shows that obviousness type double patenting does not exist. In short the '101 patent deals with the concept of pulse driving a series of LED's connected in a series for better drive efficiency by using a constant mean value current (iLED). The '434 patent uses the "master/slave" concept to drive multiple clusters using one or a minimal number of control loops. Thus, a terminal disclaimer is respectfully asserted to not be necessary for the present claimed invention which has the additional and different disclosure and features of summing the current in the second, or slave, clusters to find U_{Mess}, and comparing U_{Mess} with a desired value U_{OL} as claimed and as shown in present Figures 4b, 5 and 6.

VI. Independent claims 1 and 16 are not anticipated by Kennedy et al. 5,634,711

To summarize the reference, Kennedy discloses a hand held pulse driven LED array suitable for photocuring or phototherapy, for use in dentistry for example. One LED array 14 is disclosed and it is divided into sub arrays 14a and 14b (which are termed "clusters" by the present applicants), as shown in Fig. 3. Each LED sub-array 14a, 14b, is driven by a separate pulse width modulator, and the pulses are proportional to a control voltage EXT V_{IN} provided at control input 108. Each sub array 14a and 14b has a current overload sensor 112a, 112b which outputs a signal to a controller. Failures in each LED sub-array 14a, 14b are monitored by monitoring the actual light emitted from the LED's by using photodiode detectors 118a and 118b.

At page 5 of the Office Action, all of the elements of claim 1 are alleged to be anticipated. However, applicants respectfully note that the following elements of claim 1 are not taught by Kennedy:

" a total current detection device (R_{Mess}) for determining ~~with the aid of which it is possible to determine~~ an actual magnitude (U_{Mess}) which corresponds to ~~the~~ a sum of the currents through at least two~~, in particular through all~~ of the second LED clusters (42, 44), and

a comparison unit (50, 50a) ~~in which~~ for comparing the actual magnitude (U_{Mess}) ~~can be compared~~ with a prescribable desired magnitude (U_{OL})."

The USPTO cites Col. 6, lines 5-50 of Kennedy as teaching total current sensing, but this is respectfully asserted to be an incorrect reading of Col. 6 as discussed below.

For example, "a total current detection device" is not taught by Kennedy at least because each individual array 14a, 14b has a current sensor 112a, 112b which is independent of each other (see figure 3 of Kennedy) so no total current from both arrays is sensed, only current from

each individual array 14a, 14b is sensed.

This individual sensor approach is also used for the optical photodiode sensors 118a, 118b which are used individually for each sub-array and which do not sense current, but which sense optical output or photons instead. Thus, in Kennedy there is no total, combined, or summed current sensing or total, combined, or summed optical sensing because the sensing is individually performed in separated circuits.

Additionally, only an overload current of each sub-array 14a, 14b is detected by current sensors 112a, 112b while the optical photodiodes 118a, 118b are used to adjust the LED output of each sub array 14a, 14b. Thus, the photodiodes are relied on to detect the power output of each individual array 14a, 14b as opposed to using a total current detection device (R_{Mess}).

Additionally, "a comparison unit (50, 50a) in which the actual magnitude (U_{Mess}) can be compared with a prescribable desired magnitude (U_{OL})" is not disclosed by Kennedy. This is because U_{Mess} as claimed in claim 1 is ***a combined value,*** i.e., "an actual magnitude (U_{Mess}) which corresponds ***to a sum of the currents*** through at least two of the second LED clusters (42, 44) photodiodes (118a, 118b)." ***In contrast, individual current overload sensing devices 112a and 112b are used in Kennedy, and an optical output of each sub-array 14a, 14b is sensed individually (not combined "sum" sensing or current sensing) to control the power of the array using optical photodiodes 118a and 118b. See col. 6, lines 5-50.***

Also, present claim 1 claims a first cluster and also at least one second cluster. Kennedy only discloses first clusters 14a, 14b and no second clusters, i.e., no different kinds or types of clusters. This makes a difference regarding anticipation of claim 1 as claim 1 claims: "corresponds to a sum of the currents ***through at least two of the second LED clusters*** (42, 44)" because there are no second clusters (plural) in Kennedy, so an element-by-element anticipation

teaching is not possible. Again, only first clusters are disclosed by Kennedy.

Therefore, claim 1 is not anticipated by Kennedy.

Thus, all of the dependent claims 2-15 are also not anticipated by Kennedy as each of the claims depends from allowable claim 1 and, thus, benefits from its allowability.

In order to assist the Examiner, Applicants also respectfully point out dependent claims 2, 3, 6, and 7 as important to be reviewed by the Examiner.

Claim 2 recites the additional features of "the desired magnitude (U_{OL}) can be set by a user" to even more clearly distinguish over the prior art.

Claim 3 recites the additional features of " the comparison unit (50, 50a) is designed to output an information signal (78) in the event of undershooting of the desired magnitude (U_{OL}) by the actual magnitude (U_{Mess})" to even more clearly distinguish over the prior art.

Claim 6 recites the additional features of "the monitoring unit (50, 5b) is designed in such a way that the first LED cluster (40) is disconnected when a current flow which is outside a prescribable tolerance range is determined in the first LED cluster (40), and a second LED cluster (42, 44) is made relative to the first LED cluster" to even more clearly distinguish over the prior art.

Claim 7 recites the additional features of the drive circuit "also comprises an undervoltage detection device (64) which is designed to output an undervoltage warning signal (76) when the supply voltage (U_{Batt}) falls below a prescribable value (U_{Refl})" to even more clearly distinguish over the prior art.

Likewise, for the reasons above, in independent claim 16, the following steps are not taught by Kennedy.

> "b) measuring an actual magnitude (U_{Mess}) which corresponds to a sum of the currents through at least two of the second LED clusters (42, 44), and

c) comparing the actual magnitude(U_{MESS}) with a prescribable desired magnitude (U_{OL})."

Thus, claim 16 is not anticipated for the same reasons as claim 1. It is respectfully requested that all of the rejected claims be reconsidered and allowed.

VII. The additional reference not relied on has been reviewed in detail.

At page 9 of the Office Action, Michael et. al (6,433,483 B1) is cited. It is respectfully asserted that this reference has little to do with the present claims. It discloses a jewelry illumination article wherein LEDs are placed inside a jewel to simulate and increase the brilliance for display purposes. It does not disclose anything similar to U_{Mess} and U_{OL} for example.

VIII. New claim 17 is added and uses the master/slave terminology *per se.*

No new matter is added. Support is found in the figures and the claims. It is respectfully requested that that this claim be considered and allowed.

IX. Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,

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